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WAPSIPINICON RIVER BRIDGE HAER No. IA-77
Iowa Bridges Recording Project
Spanning over Wapsipinicon River on State Highway 150
Independence
Buchanan County
Iowa

BLACK & WHITE PHOTOGRAPHS

WRITTEN HISTORICAL & DESCRIPTIVE DATA

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HISTORIC AMERICAN ENGINEERING RECORD
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HISTORIC AMERICAN ENGINEERING RECORD

WAPSIPINICON RIVER BRIDGE

HAER No. IA-77

Location:	Spanning the Wapsipinicon River on State Highway 150, the southern approach road into Independence; Buchanan County, Iowa. UTM: 15.591210.4701167 USGS: Section 4, Township 88 North, Range 9 West
Date of Construction:	1926-27
Designers:	Iowa State Highway Commission
Builders:	Miller-Taylor Construction Company, Waterloo, Iowa
Fabricators:	None
Present Owner:	Iowa Department of Transportation
Present Use:	Highway bridge
Significance:	Significant as an unaltered, well preserved four-span, closed spandrel, reinforced concrete arch bridge with original railing that was a standard bridge type designed by the Iowa State Highway Commission during this period.
Historians:	Richard Vidutis, James Hippen
Project information:	This document was prepared as part of the Iowa Historic Bridges Recording Project performed during the summer of 1996 by the Historic American Engineering Record (HAER). The project was sponsored by the Iowa Department of Transportation (IDOT). Preliminary research on this bridge was performed by Clayton B. Fraser of Fraserdesign, Loveland, Colorado.

EVENTS SCHEDULE

January 18, 1926 - the Buchanan County Board of Supervisors votes to apply to the Iowa State Highway Commission for the improvement (grading, drainage, gravel surfacing, bridge and culvert) of Primary Road 11 from Independence south to county line.

April 6, 1926 - Mr. Hoffman, an Iowa State Highway Commission engineer, submitted three bridge types and estimated costs: three-span high truss bridge ($51,600); a four-span pony truss ($45,500); or a four-span concrete arch bridge ($49,269). Last option is recommended by Mr. Hoffman because of maintenance economy. Board votes to accept recommendation.

July 6, 1926- board votes to let contracts for earth excavation and incidental work on five miles of Primary Road 11 (Federal Aid Project No. 262), and construction of one four-span concrete arch bridge.

July 21, 1926 - bids opened from eleven companies for the bridge and eight for excavation work. Lowest bidder on bridge is Miller-Taylor Construction Company of Waterloo for $37,680, plus extras. Lowest bidder on grading and incidental work is Swanson Construction Co. of Keokuk, Iowa. Contracts are drawn up, signed, and approved by board.

September 1926 - construction delays caused by high water which washes away coffer dams and submerges two engines. Completion date extended to January 1927.

October 5, 1926 - ISHC proposes to the board to surface Primary Road 11 with gravel from Independence to county line. Board accepts proposal.

January 1927 - Miller-Taylor Construction Co. requests extension time for completion of concrete arch bridge, Federal Aid Bridge Project No. 262. Extension granted.

March 9, 1927 - board votes to go into agreement with the state highway commission and Miller-Taylor Construction Co. for filling bridge on Primary Road No. 11.

1927 - bridge completed for a total cost of $57,530.

INTRODUCTION

The Wapsipinicon River Bridge is located on State Highway 150 south of Independence, Iowa. In 1926, prior to the building of the new bridge, the crossing was on Primary Road 11. The old structure was a two-span high truss which apparently became inadequate to handle the growing traffic in Independence by 1926. Of three bridge type construction propositions, the Iowa State Highway Commission chose a four-span concrete arch bridge because it was the most economical considering the cost of maintenance and estimated low price. Since its completion date in 1927, it has continued to carry heavy urban traffic while maintaining its original structural and historical integrity.

I. REGIONAL HISTORY

The boundary of Buchanan County was defined by an act of the first Territorial Legislature which met in Burlington in the winter of 1837-38. Sumner Township was set apart as a separate township on March 7, 1857, ten years after the first settler came to the territory; Independence, which was both the principal town in the county and the county seat, was incorporated as a city in 1864. The site of the city was selected by the commissioner appointed by the legislature to locate the county seat of Buchanan County, in the later part of June 1847. By 1846, Rufus B. Clark, the first settler in the area of Independence, was followed by a few more settlers who eventually damned the river and built a few mills for the purpose of sawing lumber and milling wheat.

The city began to grow and in the 1850s Independence became a major producer of bricks, had a grain-based starch factory, and built a paper mill which made use of the water power of the Wapsipinicon River. By the 1860s Independence shipped more grain, live stock, wool and sundries than any other town on the railroad between Dubuque and Cedar Falls.[1] But by the 1870s the soils in the surrounding farmlands were becoming depleted from continuous cultivation of wheat. Wheat farms slowly moved to regions in western Iowa and local farming turned to growing corn for hog production.[2]

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[1]Harry Church and Kathryn J. Chappell, History of Buchanan County, Iowa and its People, Vols. 1 and 2 (Chicago: S.J. Clarke Publishing Co., 1914), pp. 220-25.

[2]Atlas of Buchanan County, Iowa, 1910.

Independence, continued growing as the financial and governmental center of Buchanan County. Roads were built to access the city's factories as well as the offices of the county seat. Primary Road 11 (a north-south road connecting with Cedar Rapids and the east-west State Highway 30 which crosses the whole state) eventually became State Highway 150. At Independence, the Wapsipinicon River, which flows southeast, makes a sharp angle of less than 45 degrees. It is in this north-east pocket of the river's elbow that Independence started developing and eventually united with New Haven on the west side of the river. The town of New Haven existed for several years on the west side of the Wapsipinicon River developing its own businesses, homes, and streets. For years there was no bridge uniting the two towns, fording provided the only entry. Eventually an east-west bridge was placed across the Wapsipinicon River on Main Street.[3] Travelers coming from the south on Primary Road 11 could not cross the river directly but had to circle westward around the elbow into New Haven then turn east crossing the river over the Main Street bridge.(See Fig.1, Appendix B) With the eventual placement of a north-south crossing over the river, it became possible to enter the city's center from the south thus avoiding the westward detour. (See Figs. 2 and 5, Appendix B)

II. HISTORY OF THE WAPSIPINICON RIVER BRIDGE

Preceding the new Wapsipinicon River Bridge there was a two-span iron high truss bridge which probably became inadequate to carry the increasingly motorized traffic in the city of Independence of the 1920s. On January 18, 1926, the Buchanan County Board of Supervisors voted to apply to the state highway commission for the improvement--grading, drainage, gravel surfacing, and the building of a bridge and culvert--of Primary Road 11 (later to become State Highway 150) from Independence south to the county line.[4] After three months, on April 6, 1926, an engineer from the Iowa State Highway Commission, a Mr. Hoffman, appeared before the board and was interviewed. He submitted three construction options for a bridge over the Wapsipinicon River on the south edge of Independence on Primary Road 11. The three bridge options and cost estimates presented were: three 120' x 20' high trusses with an I-beam approach on each end ($51,600); a four 80' x 20'

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[3]Buchanan County, Iowa. (The Buchanan County Genealogical Society, Independence, Iowa, 1991), p. 92.

[4]Proceedings of the Board of Supervisors of Buchanan County, Book I: p. 244 (January 18, 1926). Located at the court house in Independence, Iowa.

pony trusses with a 20′ roadway and a 4′ sidewalk on one side ($45,500); or four 80′ concrete arches with a 24′ roadway and a 5′ sidewalk on one side ($49,269). The last option was recommended by Mr. Hoffman as being the most economical because of its easy maintenance.[5] After some discussion, and in view of the fact the whole cost would be paid from the Primary Road Fund, Mr. Hoffman's recommended bridge was accepted "being the most economical and desirable type of bridge for this location, and that a copy of the resolution countersigned by the county auditor and chairman of the board of supervisors, be forwarded to the state highway commission."[6] The board's unanimous vote for the concrete arch made it the second concrete crossing in the city with the first one being put up across the Wapsi River on Main Street in 1918.[7] The board accepted Mr. Hoffman's bridge plans along with the recommendation to place the new bridge slightly west of the old truss.[8] (See Fig.3 [Situation Plan], Appendix B)

On July 6, 1926, the board let contracts for earth excavation and incidental work on 5.44 miles of Primary Road 11 (Federal Aid Project No. 262), and for the construction of one four-span concrete arch bridge; the bridge built would be a 29′ wide bridge eliminating a sidewalk which had earlier been in the plans.

On July 21, 1926, bids were opened from eleven companies. The lowest bidder was Miller-Taylor Construction Company of Waterloo with a price of $37,680 plus extras.[9] During construction in

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[5]The historic description of the Wapsipinicon River Bridge (BUCH02) in Iowa Historic Bridge Inventory (Fraserdesign, 1993) mistakenly reports that the design option chosen by the Board was also the cheapest of the three designs prepared by ISHC and submitted by Mr. Hoffman. In fact it was the second cheapest, but offered the most economy over the others in its ease of maintenance, a feature preferred by the Board.

[6]Ibid., p. 251 (April 6, 1926).

[7]Bulletin-Journal: p. 1 (April 8, 1926).

[8]Ibid., p. 1 (July 8, 1926).

[9]The ten other companies that bid on the concrete arch bridge were: J.B. Elliot, Independence ($42,500); Geo. B. Palmer Co., Minnesota ($48,792); Fifield Construction Co., Waterloo ($41,650); Capital Construction Co., Des Moines ($40,457); H.O. Graham, Cedar Rapids ($39,840); A. Olson Construction Co., Waterloo ($39,440); Weldon Brothers, Iowa Falls ($39,913); Widell

September, work delays were caused by high water which washed away coffer dams and submerged two engines.[10] These delays also ended up increasing the cost of the bridge and delaying its completion; in January 1927 the Miller-Taylor Construction Co. requested time for completion of the bridge, which was granted, although the amount of extended time was not specified.[11] Towards the end of construction, on March 9, 1927, the board voted to go into agreement with the state highway commission and Miller-Taylor Construction Co. for filling the bridge on Primary Road No. 11. The bridge was probably completed by the summer of 1927, but for a total cost of $57,530, almost 60 percent more than the original estimate.[12]

III. DESIGN AND TECHNOLOGY OF THE WAPSIPINICON RIVER BRIDGE

The Wapsipinicon River bridge at the south edge of Independence has been, since its construction in 1926-1927, a key link in Iowa's road system. Established in 1919, the state primary road system established numbered routes throughout the state, successors to the old "trails" established by private initiative. Primary Road Number 11 ran north from Van Buren County at the southern edge of the state through Cedar Rapids and Independence to Winneshiek County on the Minnesota border.[13] In addition to its location on route 11, and also on the main road from Dubuque to Waterloo, Independence had another reason for being a place of statewide importance. Located here was the Independence State Hospital, for mental illness. It was one of seven major state institutions, prisons and hospitals, which (sadly) drew inmates and visitors from a large area. The Independence hospital had a population of 1,423 in 1926, the second largest of these

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Co., Mankato, Minnesota ($52,750); H.A. Maine Co., Waterloo ($41,414); and Federal Bridge Co., Des Moines ($45,371). The lowest bidder on road grading and incidental work was the Swanson Construction Co. of Keokuk, Iowa. Ibid., p. 274 (July 21, 1926); Bulletin-Journal: p. 1 (July 22, 1926).

[10]Bulletin-Journal: p. 9 (September 23, 1926).

[11]Ibid., Supervisors' Minutes, p. 397 (January 6, 1927).

[12]Bulletin-Journal: p. 1 (April 7, 1927).

[13]William H. Thompson, Transportation in Iowa: A Historical Summary (Ames: Iowa Department of Transportation, 1989), p. 73 and map; Official Map, Primary Road System, State of Iowa (Ames: Iowa Highway Commission, 1919).

institutions in the state.[14] All of these factors justified a substantial bridge to handle the increasing automobile traffic.

The Wapsipinicon Bridge is a four-span filled spandrel arch of reinforced concrete. The spans are 80′ each, and the roadway was built 24′ wide. The arches are single rings, uniform across the width of the bridge, and the foundations are carried to rock. The design was done specially by the highway commission and built with the assistance of federal aid.[15]

The design is in a restrained Beaux Arts Renaissance revival manner, influenced by the City Beautiful movement which had called forth many arch bridges in large cities such as Des Moines, Waterloo, and Cedar Rapids. The style spread to county towns where civic pride and the need for permanent bridges to handle the increasing motor traffic justified concrete arches. Independence had the added incentive of an arch bridge built downtown in 1917 to replace the truss, a constant reminder of what could and should be.

By the time the Wapsipinicon Bridge was designed and built, concrete arches were not a novelty, and did not involve difficult engineering provided they were built on a rock or another solid base.[16] In fact, this bridge has been identified as a "late example" of the type.[17] Therefore, the bridge is not noteworthy because of innovation of design, but because of its excellent condition is an example of competence in design and construction. The contractor was Miller-Taylor Construction Company of Waterloo, Iowa. Although they experienced delays due to damage caused by high water, the end product has endured. Success in completing such a product lies largely in attention to detail:

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[14]State of Iowa 1927-28 Official Register, 182.

[15]Design for Multiple Span Concrete Arch Bridge, Iowa Department of Transportation file 6580; Report of the State Highway Commission for the Year Ending December 1, 1926 (Ames: 1926), p. 15.

[16]Milo S. Ketchum, The Design of Highway Bridges of Steel, Timber and Concrete, 2nd ed. (New York: McGraw-Hill, 1920), p. 419, shows an Iowa Highway Commission design for a 50′ reinforced concrete arch.

[17]Fraserdesign, Iowa Historic Bridge Inventory (1993), p. BUCH02.

the proper placing of reinforcement or the proper mixing and placing of concrete.

As an example of the latter process, the plans carefully prescribe a procedure for pouring the concrete in the arch ring. The arch is divided approximately into fifths, and the fifths at the lower ends are to be poured first. Then the fifth in the middle, at the crown, is put in place. Finally the other two fifths, to join the three sections already poured, are put in. This keeps the centering (supporting framework) from being distorted by the weight of the concrete. The plans also note "the centering of nor arch to be removed until the concrete of the adjacent span is in place."[18] If this rule was not obeyed, the arch could and most likely would collapse.

The Wapsipinicon Bridge represents a mature technology combined with a style--the Renaissance arch--which had a strong public appeal. The combination was a successful one.

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[18]Plans, sheet 2, DOT file 6580.

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APPENDIX A Bridge Designs for Wapsipinicon River Bridge (Independence)

Microfilm files located at the Iowa Department of Transportation, Ames, Iowa. Filed under: File 6580, Design 126.

1. *Design for Multiple Span Concrete Arch Bridge. 4-80'-0 Spans, 24'-0 Roadway, and 5'-0 Sidewalk Over Wapsipinicon River at Independence, Iowa.* Sta. 587+47. Federal Aid Project No. 262. IHC. June 1926. Design 126. [3 sheets]

2. *South Bridge of Independence on Primary Road System.* State of Iowa, State Highway Commission. Federal Aid Project No. 262. Sections D. Buchanan County, From the Benton County Line North into Independence. June 1926. [1 sheet]

APPENDIX B List of Illustrations

Fig.1 From map of Sumner Township. Plat Book of Buchanan County, Iowa, 1886.

Fig.2 From map of Sumner Township. An Atlas of Buchanan County, Independence: The Independence Conservative, 1923.

Fig.3 "Situation Plan" (bridge plan detail of previous truss and proposed concrete arch. From: *Design for Multiple Span Concrete Arch Bridge*. June 1926.

Fig.4 Profile sketch of the Wapsipinicon River Bridge (Independence). Jim Hippen, 1996.

Fig.5 USGS topo. map. Independence Quad., 1973. 7.5 min. series.

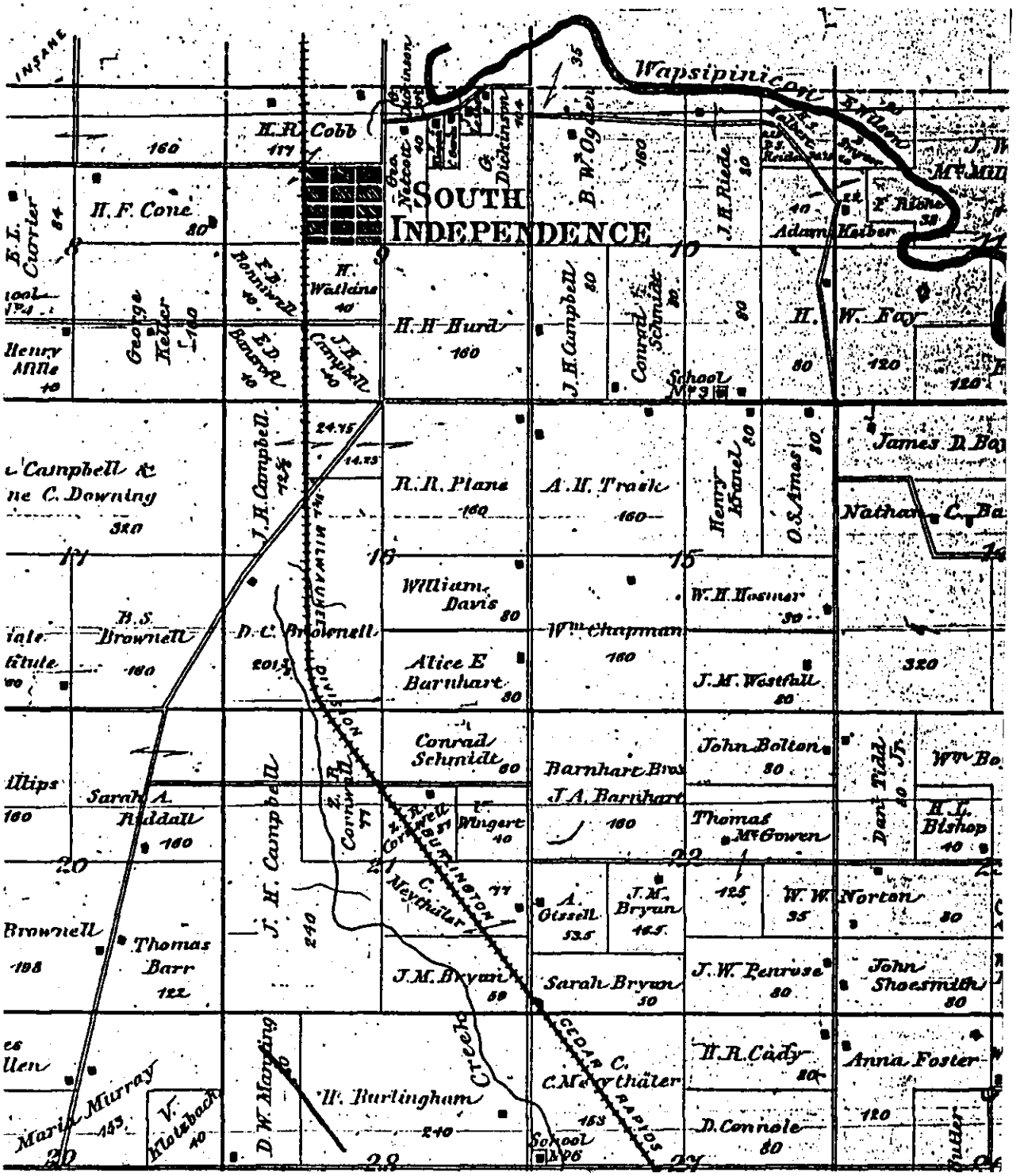

Fig.1 From map of Sumner Township. Plat Book of Buchanan County, Iowa, 1886.

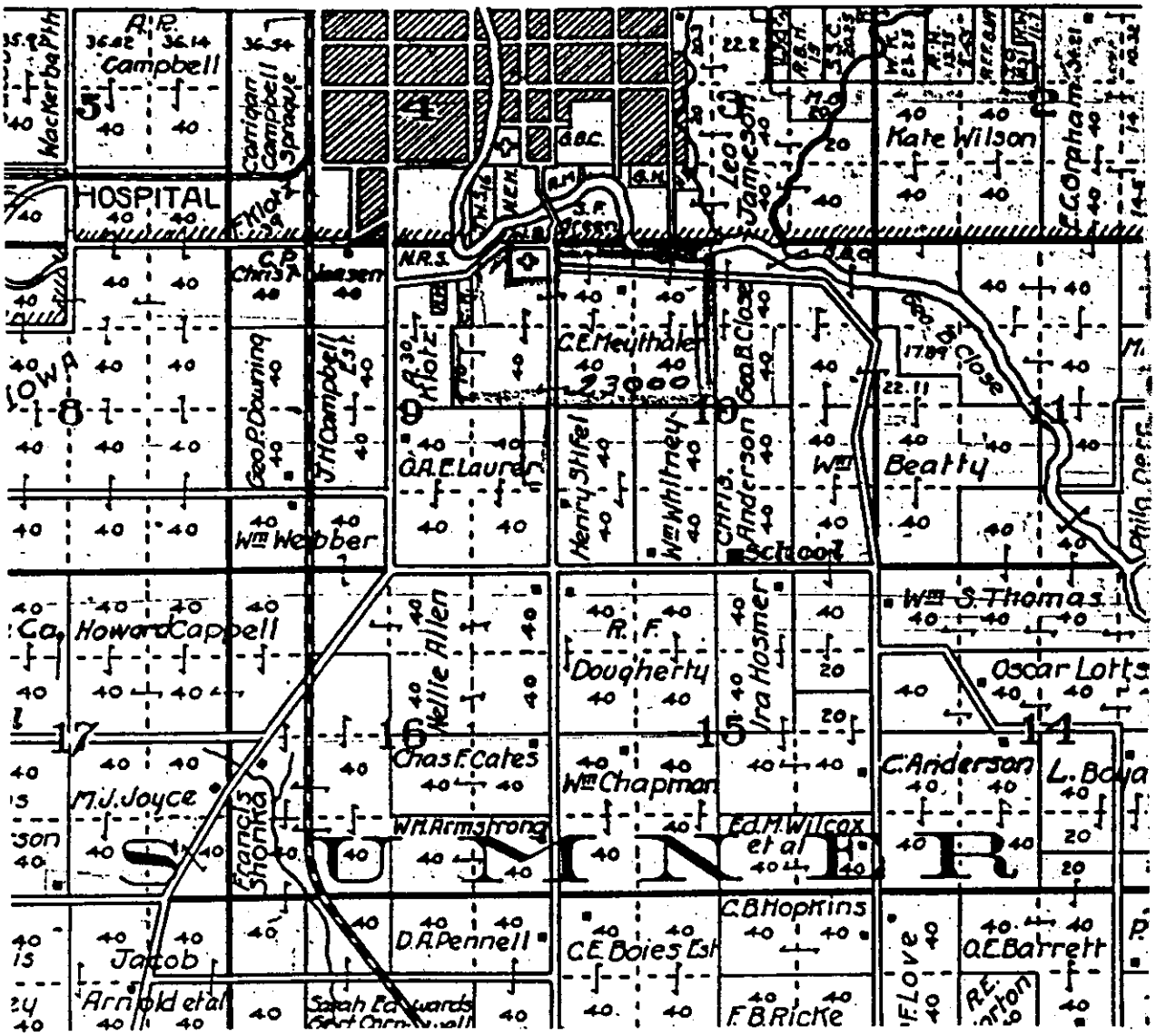

Fig.2 From Map of Sumner Township. An Atlas of Buchanan County. Independence: The Independence Conservative, 1923.

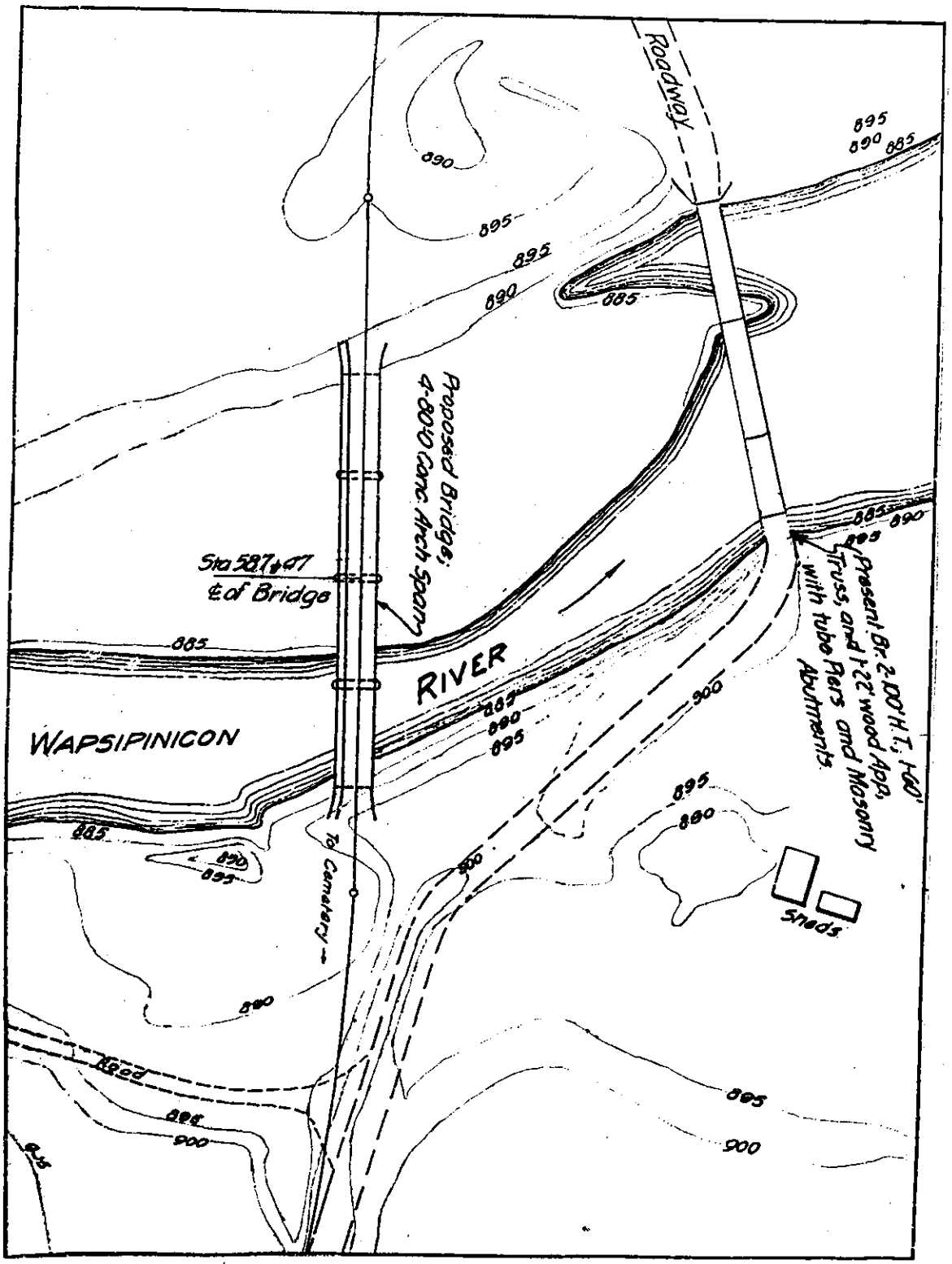

Fig.3 "Situation Plan" from bridge plans: *Design for Multiple Span Concrete Arch Bridge*. June 1926.

WAPSIPINICON BRIDGE, INDEPENDENCE

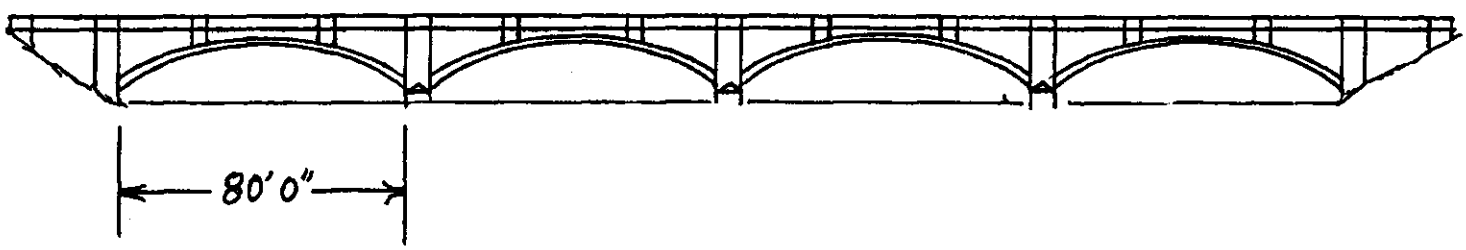

Fig.4 Profile sketch of the Wapsipinicon River Bridge (Independence). Jim Hippen, 1996.

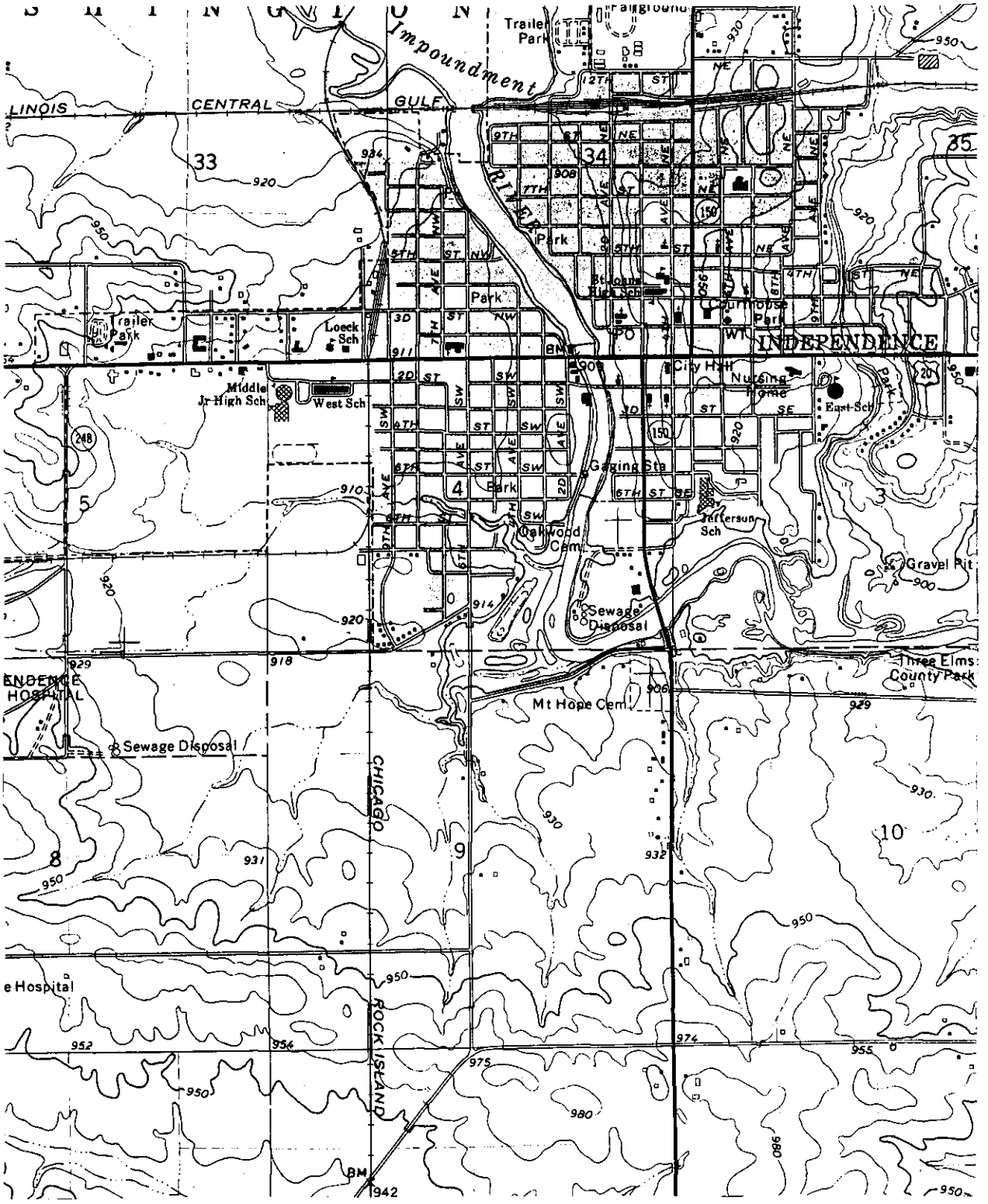

Fig.5 USGS topo. map. Independence Quad., 1973. 7.5 min. series.

APPENDIX C Research Statement

Research Limitations

No historic photographs of the Wapsipinicon River Bridge were found.

Future Directions for Researching the Wapsipinicon River Bridge

Local historical societies and libraries should be searched for historic photographs.

ADDENDUM TO
WAPSIPINICON RIVER BRIDGE
Iowa Historic Bridges Recording Project II
Spanning Wapsipinicon River at State Highway 150
Independence
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WAPSIPINICON RIVER BRIDGE

This appendix is an addendum to a 18-page report previously transmitted to the Library of Congress.

APPENDIX: ADDITIONAL REFERENCES

Interested readers may consult the Historical Overview of Iowa Bridges, HAER No. IA-88: "This historical overview of bridges in Iowa was prepared as part of Iowa Historic Bridges Recording Project - I and II, conducted during the summers of 1995 and 1996 by the Historic American Engineering Record (HAER). The purpose of the overview was to provide a unified historical context for the bridges involved in the recording projects."